



On the Restoration of Congenital Fissure affecting the Hard and Soft Palates, with a comparison of the resources individually offered by Prothesis and Autoplasty. A letter addressed to Professor Lawrence, by DOCTOR DEBOUT.

DEAR SIR,—It was not permitted your illustrious friend, M. Roux, to complete the work in which he proposed to make us acquainted with all he had seen or done of notable utility during his long professional career. But he had at least the consolation of terminating that portion in which he took the greatest interest on account of the large share he took in its elucidation, and which we have termed *restorative surgery*.

I shall not here examine whether our skilful surgeon has not omitted, in spite of the large space allotted to this subject, the consideration of

some of the affections naturally allied to it. He has himself taken care to obviate any reproach upon this account, by informing us that he writes more to demonstrate the really valuable assistance offered by those applications of restorative surgery which he has attempted with the most success, than to compile a complete treatise upon the subject.

And thus, in alluding to vesico-vaginal fistula, in the treatment of which restorative surgery has given such brilliant results in the hands of M. Jobert, M. Roux, not taking sufficiently into account the experience of others, says, "There are other restorations of too recent a date, and so lately instituted, as not to allow of their having been performed a sufficient number of times to enable us to pronounce upon their proper value, or to appreciate the especial worth of the different processes of which each is capable."

But we may justly criticise our illustrious master as to his voluntary silence regarding the value of such prothetic apparatus as industry, alone and unassisted, has succeeded in creating, to remedy deformities which even his skilful hand had failed to remove. Restorative surgery being, according to the definition of M. Roux himself, that part of our art especially destined to restore deformed organs, or those having suffered a loss of substance more or less considerable, to such a condition as will enable them to accomplish their natural functions; our art would often fail, to bring about this result, were we to omit the study of the real resources offered to us by prothesis.

For example, when the mutilation is confined simply to the soft parts, and the loss of substance is not too considerable, we are able, by ingenious processes, to render an increased mobility to the neighbouring parts and thus bring them into contact. It is no longer the same when the loss of substance affects the bony structures; here coaptation is no longer possible, and synthesis must give way to prothesis. Synthesis and prothesis are but portions of the same whole, and has not M. Roux, in consecrating an entire volume of his work to restorative surgery, and still confining himself to the consideration of synthesis alone, been guilty of a serious omission? It is a doubt which I beg your permission to express.

For some considerable time we have lost no opportunity of impressing upon surgeons the loss accruing to science, from their abandonment of all study of mechanical apparatus to instrument makers and the patients requiring them, and we wish to continue our task.

Operative surgery must at length learn to take into account the resources offered by prothesis. According as this latter becomes capable of repairing greater mutilations, the operative surgeon will become more enterprising. But a few years back would any surgeon have dreamt of removing the two superior maxillæ.

But at the same time that the operator may, in the present day, become more daring, owing to the abundant means now offered for filling up the

breaches that he makes for the safety of his patients, he ought also to learn to give place to prothesis, so soon as this latter has attained a sufficient degree of progress to accomplish the end in view.

Regarding prothetic apparatus, their trial is in all cases inoffensive, this is far from the ease in respect to the applications of autoplasty, which, to say the least, in cases of non-success, leave the loss of substance greater than before.

Therefore, would it not be wiser to commence by a trial of these means, in all cases where their success is probable or even possible, instead of recurring as a last resource when we have already rendered its task more difficult? Such is the question which I desire to lay before you, as the person whose long experience has most fitted, to give us a solution.

I have chosen for my subject the restoration necessitated in the buccal cavity by the congenital fissure of the palate, implicating both hard and soft structures.

M. Roux, in his *Conservative Surgery*, has shown what resources are offered to the surgeon by operative interference. Allow me in turn to lay before you the real value of the means that prothesis affords us in the treatment of these affections.

I have neither the authority nor the talent of demonstration possessed by our professor; consequently I shall speak by facts, and leave them to plead the cause which I defend.

I have taken for example the most complicated of these cases, viz., a case in which the arrest of development affected the lip, the palatine arch, and the velum pendulum palati, constituting the deformity known with us as *gueule de loup*. I shall thus have occasion to indicate the share which in restorative surgery falls to the lot of synthesis and prothesis individually.

Operative surgery, by borrowing the required tissue from the directly adjoining parts (*l'autoplastie par glissement*), easily succeeds in closing the labial fissure, and in restoring the nose to its normal form. When this autoplastic operation is performed during the first months of existence, as is now most frequently the case, the influence of the simple restoration of the lip causes the gradual disappearance of the breach in the alveolar portion of the maxilla.

Such is not the case with the fissure of the bony palate; the palatine cleft remains unchanged. Nevertheless, were it possible to perform the operation of staphyloraphy at the same epoch as that for hare-lip, the union of the soft parts would exercise the same influence upon this fissure as upon that of the dental arch; the separated portions of the hard palate would so far approach each other as to leave but a slight longitudinal fissure which it would be easy to close.

But staphyloraphy is not an operation which can be performed upon very young subjects. In the words of M. Roux, "That it may be

performed with precision and employed with success, the patient must possess a strong will and a firm resolution, he must have the sentiment of his infirmity and a lively desire to get quit of it; he must be possessed of the courage necessary to affront the pain; and be capable of presiding over himself during the after treatment; he must also have sufficient force of character and patience to endure certain privations necessary to ensure success.

“Nothing can be commenced, pursued, or terminated, without his concurrence, without his will, without his participation. The degree of reason and the force of character possessed by a person of from 18 to 20 years of age is no more than is necessary; but it is sufficient; and we ought to profit by this the first favourable moment, in order to afford as soon as possible, to such as suffer from the errors of nature the benefits which art may be able to procure them. Waiting a few years later would only give perchance to our patients a greater resignation and a more firm courage, without placing them in other respects under more favourable circumstances.” We have preferred giving the words of M. Roux, himself, in order that we might not be taxed with having, in the interest of our cause, retarded the epoch favourable to the intervention of our art; and exaggerated the moral qualities necessary in a patient who would undergo the operation of staphyloraphy with a prospect of success.

It is unnecessary to describe the operative processes of M. Roux, for the restoration of cleft palate, inasmuch as they have become classic, we shall simply indicate the results which he obtained in those cases where the cleft embraced both hard and soft structures—the only class of cases occupying our attention at present.

Of the 51 cases of complete cleft operated on by M. Roux, four underwent the operation a second time, and only one out of these four was cured by the second operation. He obtained occlusion of the cleft in rather more than half of the cases operated on, that is, in 26 of his patients.

Our skilful surgeon had just reason to be satisfied with such a result, from the fact, that the interval separating the two portions of the velum pendulum palati is generally much greater, than in those cases where the cleft affects only the latter organ. In fact, M. Roux, in most of his cases practised the separation of the soft from the hard palate.

In terminating his work, M. Roux makes the following remarks:—“In this class of cases we must not understand by success or favourable result the simple union of the two portions of the velum pendulum palati. After having obtained this result, which is ever incomplete, certain phenomena resulting from the simple efforts of nature are soon to be observed. There should be a spontaneous diminution of the distance between the two portions of the bony palate, after which, should there still exist an opening forming a communication between the mouth and nasal cavities, surgery may again be called on to interfere, but by other than the former means;

we may either attempt the definitive occlusion of the still existing aperture by means of palatoplasty or we may simply maintain it closed by means of an obturator."

We observe that M. Roux is at length obliged to call in the aid of prothesis; but what services did these mechanical apparatus render to his patients? He is completely silent upon this matter, although he must have had many opportunities of verifying the results of their employment.

Let us leave for the present this point of the question, in order to occupy ourselves exclusively with the 25 individuals to whom operative surgery was of no utility, those whom both surgeon and surgery abandoned to their sad fate. We shall mention the services which prothesis is able to render them, and, after having verified their reality, we shall be allowed to establish a comparison between the resources, so widely differing, of these separate portions of restorative surgery.

M. Roux is the last surgeon who could plead ignorance, as to the remarkable progress then realized by prothesis in the treatment of congenital cleft of the velum pendulum palati. In 1845, M. Stearns, an American surgeon, exhibited to him and to his colleagues at the Academy of Medicine, the services which a well conceived and adapted apparatus was capable of rendering to individuals affected with this vice of conformation.

The history of this surgeon is full of interest. Born with cleft palate, and arrived at the age of choosing his profession without having received any efficient aid from the numerous practitioners of his country, M. Stearns, fixed upon the study of medicine. With the old proverb, "*Aide-toi, le ciel t'aidera,*" before him, he hoped by his own efforts to arrive with more certainty at a means of remedying his infirmity.

The physiological study of the vocal apparatus soon instructed him as to the role of the velum pendulum palati in the act of phonation, and M. Stearns, being gifted with great mechanical aptitude, was not slow in laying his hand upon the substance which was to permit him to realize his desire. Some attempts had already been made with this end in view. Nasmyth, dentist to her Majesty Queen Victoria, had constructed an obturator, the posterior portion of which was composed of gold plates, imbricated one upon another like the scales of a fish. This disposition gave mobility to his apparatus, but its weight was too great to allow of its being easily raised by the column of air as it escaped from the glottis in the act of phonation. M. Stearns had the happy idea to substitute gutta percha for the metal, and, by an ingenious combination of plates of this substance, he succeeded in constructing a light apparatus, which answered very well its destined purpose.

Unfortunately caoutchouc, in the natural state, does not possess sufficient resistance to the action of the agents, more or less destructive, of the buccal cavity—viz., animal heat, acid secretions, and alimentary deposits.

M. Stearns was consequently obliged to renew frequently his artificial palate; nevertheless, the greater difficulty was overcome, and the mechanical combination already arrived at, and it was not long before a valuable discovery came in to crown the efforts of our *confrère*, by enabling him to bestow upon his artificial apparatus the wanting qualities. The vulcanization of caoutchouc allows it to remain in the mouth for months without alteration, and, at the same time, in no way interferes with its flexibility or lightness.

If the apparatus realized by M. Stearns was not appreciated by M. Roux, its importance did not escape the sagacity of Vidal de Cassis, inasmuch as we read in the edition of his work upon *External Pathology and Operative Surgery*, which followed the presentation of M. Stearns at the Academy:—"When the instrument is adapted, M. Stearns speaks absolutely as if the structures of his palate were in a state of perfect integrity, but upon its removal his voice assumes all the characters special to persons labouring under cleft palate, and his language becomes unintelligible." He further adds:—"If this instrument can be fixed so that there shall be no danger of the patient's swallowing it—if its attachment to the teeth does not loosen them—if, in reality, its presence in the buccal cavity be not irksome, and if its influence upon the voice and pronunciation be such as the experiment made upon himself, by this American surgeon, seems to prove, we might, I believe, dispense with perhaps the greater portion of the organic reparations at present practised upon the palate."

On his quitting this country, M. Stearns failed to leave with us here in France a model of his apparatus; consequently, the instruction that he came over to afford us as to his new application of prothesis was lost, and his discovery would still have been buried in the archives of science had it not been for a distinguished dentist whom we possess. M. Prêterre, upon settling amongst us, undertook to demonstrate all the reality of buccal restorations by prothesis. His success has earned for him the friendly esteem of our most eminent surgeons. In fact, M. Prêterre came forward with a generosity doing him infinite credit, in order to furnish us publicly, upon our hospital patients, the proofs of what this branch of art is capable; and there is at present scarcely an hospital surgeon who has not in his wards an example of the value of prothesis in buccal restorations. Here it is a superior maxilla, removed in totality—there an inferior maxilla, the anterior portion of which has been resected; elsewhere a cleft palate, now affecting the velum pendulum palati; now the bony palate; and now all the structures indiscriminately, which we find restored by the ingenious application of prothesis.

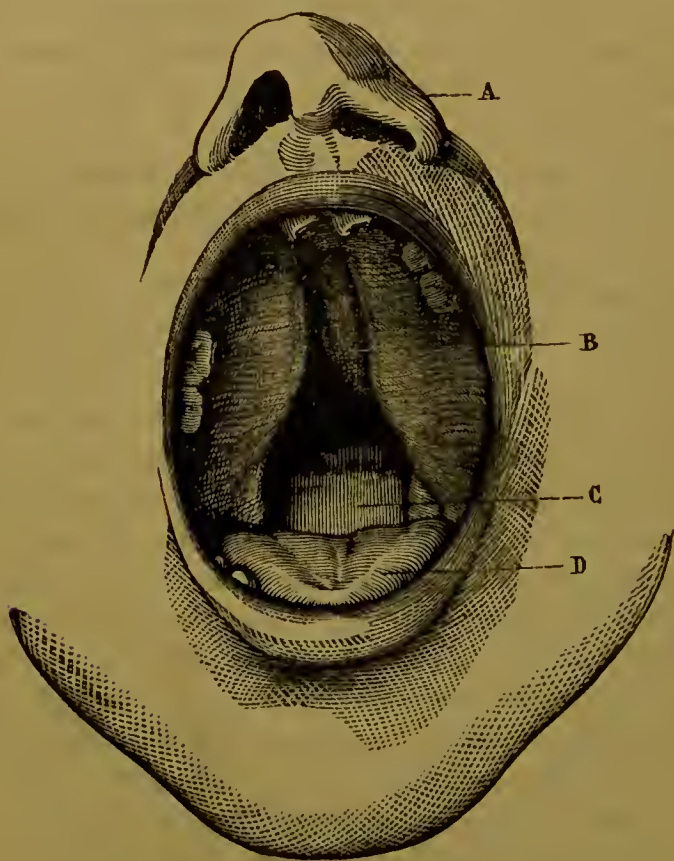
I have also taken advantage of the zeal of Monsieur Prêterre in the present instance. Having encountered an old patient of M. Roux, upon whom he had performed, unsuccessfully, the operation of staphyloraphy,

I entreated M. Prêterre to furnish me with the proof of the progress he had made, and of the improvements which the models created by M. Stearns had undergone at his hands. The following are the notes of the case :—

Hare Lip, complicated by Congenital Cleft, affecting both Hard and Soft Palate—Restoration of the Lip at the age of six weeks—Unsuccessful Attempt at Staphyloraphy at the Age of Thirty—Applications of Obturators with movable velum.

Lemaitre, *employé*, 54 years of age, born with a fissure affecting the left side of the upper lip. The labial fissure was accompanied by a large cleft of the hard and soft palate. His infirmity hindered him from taking the breast, and it was some time ere a suitable means of feeding him could be found. An ordinary tobacco-pipe was first employed ; the bowl being filled with milk the thumb was placed upon it, and the stem laid upon the base of the tongue, when, by alternately lifting and replacing the thumb,

Fig. 1.



one was able to control its exit. At a later period a small bottle was employed in the following manner :—It was filled with milk, and a morsel of sponge the size of the little finger, and about two inches in length, was attached by means of a piece of linen to its orifice. With the aid of this

sucking bottle Lemaitre was reared, but not without difficulty, and consequently his mother eagerly accepted the operation immediately upon its being proposed. The restoration of the hare-lip was attempted with full success at the age of six weeks; but, the surgeon not having incised sufficiently the left nostril, Lemaitre was left with that side of his nose much flattened, as may be observed by the wood cut A, left nostril, which has remained flattened, owing to the insufficient division of the upper portion of the nasal fissure. In the anterior portion of the palatine fissure the vomer, B, is observed fixed to the left maxilla. The distance separating the two portions of the velum pendulum palati is much greater than usual, owing to the unsuccessful attempt of M. Roux at staphyloraphy. At the back of the mouth we may perceive a kind of muscular layer, C, projecting forwards, especially during the act of deglutition. It then seems as if the posterior pharyngeal wall (under the influence of the contraction of the pharyngo-staphylinus, or middle portion of the palato-pharyngeus) is projected forward as if to close the existing cleft.

Inhabiting the country, and occupied with field work, he felt less the inconveniences of his infirmity than he would have done had he dwelt in a city, and been engaged in an occupation requiring more frequent intercourse with his fellow-workmen. But still this man, who is very intelligent, acutely remarks, that the country people being less intellectual than townsfolk, he frequently had much difficulty in making himself understood by the former; and, on this account, he decided upon taking a situation of shop-boy at Havre; and it was in this place that M. Isidore Geoffroy Saint Hilaire, in the year 1847, proposed to bring him to Paris, in order that he might be operated on by one of our skilful surgeons. The mockeries of which he was from time to time the object, and especially the desire to be able to speak as distinctly as the rest of us, induced him eagerly to accept the friendly offer of the illustrious naturalist.

Lemaitre, on his arrival in Paris, was immediately confided to the care of M. Roux, and placed by him in his ward of St. Marthe, at the Hotel Dieu (No. 7). After the usual preparatory treatment, M. Roux performed the operation of staphyloraphy. Three sutures were applied, and the union was so rapidly accomplished that, at the expiration of 48 hours, M. Roux thought himself warranted in removing the sutures. That he was too hasty was proved a few hours later by the re-separation of the flaps, thus reproducing the fissure, and leaving the infirmity greater than before.

Immediately after the removal of the sutures a glass of wine was given to the patient, and Lemaitre, who up to this time had been perfectly free from fever, now began to suffer from quick pulse and other signs of an alteration of his health. Under these circumstances what influence must we attach to the moral effect of the disappointment in seeing all his hopes destroyed?

The fact is that, under the influence of these exciting causes, an erysipelas

of the scalp manifested itself upon the fourth day following the operation, and became so intense as to necessitate an incision behind the right ear. This attack of erysipelas was the principal cause of his not undergoing a second operation. Immediately upon his recovery he quitted the Hotel Dieu.

Lemaitre, ashamed of returning to Havre still suffering from his infirmity, and having relations in Paris, preferred staying here, and it was not long ere he found employment. A few months since, coming by accident across this man, it occurred to me to make use of him in judging the value of prothesis in cases of cleft palate affecting simultaneously the hard and soft structures, and I conducted him to M. Préterre. The wood-cut Fig. 1, indicates the extent of the lesion left for this dental surgeon to repair.

On the 1st of November, 1861, M. Préterre adapted the first model, a copy of which we adjoin :—

Fig. 2.



Plaster Cast of the superior Maxilla of our Patient, and Model of the Obturator destined to close the enormous Fissure.

The plaster cast indicates the irregularity in the position of the teeth,

the incisors and canines bearing especial evidence of the congenital lesion. The fissure is long, large, and gaping, commencing at the union of the anterior third with the posterior two-thirds of the bony palate, and then dividing the velum pendulum palati, so as to suppress the uvula, and leave intact only the anterior pillars. Its limits are denoted in the plate above by the dotted lines.

The obturator is summarily composed as follows:—A metallic plate (3) is exactly moulded to all the inequalities of the remaining palate, and nicely adapted to the teeth, sending out prolongations in the dental interstices, in order to give fixity to the apparatus. Allow us here to mention, as a peculiarity, that in this case the plate of gold is cut out in such a manner (5) as to leave uncovered the gustatory papillæ, situated behind the incisors. But this disposition is not always, or even often, practicable, owing to its interference with the solidity and adherence of the apparatus. To the posterior border of the plate (3) is fixed another metallic rim (4), by means of three tenons turning on their axis, fixed upon the plate (3), and fitting into mortices of the plate (4). These tenons and mortices are indicated by the letter (E). It is between the plates (3) and (4) that the flexible velum of caoutchouc (1 and 2) is fixed. But the plate (4) serves another end besides the fixation of the artificial velum—it affords support to a whole system of springs, maintained in place by six screws, three on each side.

The caoutchouc, being moulded upon the soft parts, and to the edge of the fissure, presents different degrees of thickness, necessitating the employment of springs, differing in their force according as the caoutchouc differs in thickness. These springs may be enumerated as follows:—In the median line is observed a pendulum or needle-spring (C C), the lentil or weight of which may be made to approach or recede from the centre of oscillation by means of the screws (D D). The force of this spring is considerable—it is due to the action of a *tempered gold wire*, arranged in the form of a spiral (A A), and fixed to the upper surface of the plate (3). The energy of this spring may be further modified, either by loosening the spiral or by changing the position of the nut working upon the screw (B B); the mobility of this nut is itself regulated by a flat spring, twice turned upon its horizontal axis. Further outwards, on either side of the spring (C), we have a flat spring of tempered gold wire. These springs, attached to the plate (4) at the junction of the external with the middle third, are carried outwards and far backwards, to be fixed to the thinner portion of the caoutchouc; and, lastly, we have at each outer edge a spring of the same nature, but much shorter, and corresponding to the thicker portion of the caoutchouc.

This model had perfectly succeeded in a case of M. le docteur Cornag, of Neufchatel; and in the month which has now elapsed since this apparatus has been worn by Lemaitre, with the assistance of an hour's daily exercise,

superintended by M. Prêterre, he already speaks with surprising ease. This rapidity of result is not usual, and depends upon the great intelligence and tenacity of the patient.

Inasmuch as M. Prêterre shortly intends to read before the Academy of Medicine a paper upon the apparatus destined to remedy congenital cleft palate, and on the special education necessary, as part of the treatment in such cases, I shall not enter upon this subject, but content myself with the mere mention of the good results I have witnessed.

There is, however, an error which I should wish to point out—an error under which the greater number of medical men still labour—and that is, that so soon as the artificial palate shall be adapted, the subjects of congenital cleft palate should be able to speak immediately, and correctly. By promising such a result to their patients, they lead them into serious error, and cause much bitter mortification to the artists undertaking the prothesis of this deformity.

In order to understand this fact, we have merely to call to mind the altered conformation of the different parts of the vocal apparatus, and the rôle which they are suddenly called upon to perform.

The upper lip has, in point of fact, been restored—that is, the fissure which it presented no longer exists, but the labial tissues are far from being normally organised. The muscular tissues have suffered in their development; it is less abundant at the point of reunion; and this portion of the lip consequently possesses less mobility; moreover, there exists almost invariably at the inferior extremity of the cicatrix a notch more or less evident. From these modifications it happens that, whenever individuals who have been operated upon for hare-lip pronounce labial sounds—as eu, ou, &c., the under lip takes more than its share in the movement; and, besides, there is an effort to close the notch or slight remnant of the ancient fissure.

The conformation of the palate is not less vicious; the separation of the bony halves of this arch enlarges the buccal cavity, and diminishes, in a relative degree, the nasal fossæ; and it is evident that the application of an obturator can only close the communication between these cavities, and in no way remedy the modifications depending upon the change in their relative capacity; and it is this alteration which especially influences the tone of voice, which most frequently is, in these cases, snuffling, especially when the nostril remains flattened.

Lastly, we arrive at the rôle required of the artificial velum pendulum palati. The mechanical problem was difficult to resolve; for, although the plate of caoutchouc is as soft and flexible as the natural soft palate, it is unprovided with muscular action. Here it was that the artist had to call to his aid all his ingenuity: he had here to create a fictitious force, which could raise the velum to the height necessary for the act of phonation. M. Prêterre, in the apparatus designed in the present paper,

has attained this object by, in the first place, giving the plate of caoutchouc a greater thickness at its base ; and, secondly, by the application of a series of gold springs, which he has succeeded in rendering as flexible as steel.

When one reflects upon these modifications, as well organic as prothetic, and the influence they necessarily exert upon the phonic apparatus, one easily understands that the individuals suffering from this infirmity, although possessing the most complete apparatus, must still devote themselves to an especial study, and that the time necessary should be not less than from three to six months ; the result is the more complete, as the lesion is less profound, and the individual possessed of greater perseverance.

Now that we have established by facts the reality of the resources of prothesis in the treatment of congenital cleft palate, it may seem that we have now only to trace the comparison between the advantages offered, on the one hand, by the new apparatus, and, on the other, by operative surgery.

But, previously, we must mention the distress occasioned by this vice of conformation, in order that it may be placed in the balance against the inconvenience of obturators, and the dangers of autoplasty. This view of the question is completely neglected in the classical works on the subject, notwithstanding the influence which this point ought to have in determining the surgeon to interfere, and the weight it should exert in the choice of means to be employed.

The distress occasioned by congenital cleft of the palate varies greatly at different periods of life. At the age favourable to surgical interference, the infirmity merely affects the organs of speech ; of whatever extent the cleft may be, these individuals swallow with the same facility as if the internal conformation of the mouth was normal. This is by no means the case at birth.

Cleft palate, affecting all the structures, is one of the deformities most directly compromising an infant's existence, by the obstacle it offers to suckling.^a The silence maintained by authors on this subject, as well as upon the artifices to be employed in these cases, induces us to reproduce the first portion of a very interesting paper addressed by Eustache (de Beziers), in 1778, to the ancient Academy of Surgery. This paper would have remained unknown had not one of our most distinguished rising surgeons, M. Verneuil, undertaken to scrutinize the archives of this celebrated association, and to publish such fragments as might be useful to science. Although his publication was arranged with an especial view to the history of Staphyloraphy, our sagacious *confrère* has taken care to

^a In the 15th number of the *Compendium de Chirurgie*, which has appeared since the termination of this article, we find the following assertions :—“ Congenital division of the velum pendulum palati does not compromise existence.”
“ One ought not, in these cases, to reckon upon the applications of prothesis.”—(Page 754). These lines furnish us with further proof of the importance of our study.

point out the value of this communication regarding our present subject. See, here, the entire document. We must at present notice that Eustache employs an improper expression in speaking of the vice of conformation as *absence of the velum pendulum palati*. This error, as indicated by M. Verneuil, depends upon the smallness of this organ at birth, rendering the two portions but slightly visible. Having mentioned this error, we return to our citation.

Observations on Several Cases of Children Born with the Velum Pendulum Palati Absent : followed by an Essay upon a Means of Reuniting Recent Divisions of that Organ. By EUSTACHE DE BEZIERES.

“ . . . Every one is aware that the soft palate is especially destined to moderate and direct the descent of food and drink, and to hinder them from ascending into the nasal cavities; that it further serves to direct the air expired; that the act of swallowing depends on it, as well as the charm of the voice and the sonorous articulation of words. But if this fleshy partition is so essential to the adult, it is not less so to the new-born infant, to enable it to suck from its mother's breast the vital juice so admirably elaborated in its veins by Nature. The case of one of my own children, observed with all the exactitude that paternal tenderness could inspire, will furnish evident proof :—

“ OBS. I.—*First Observation made upon one of my Children, Born with complete Absence of the Velum Pendulum Palati.*—In 1778 my wife was safely confined with a male child, which appeared, at first sight, well developed. Some little time after birth a little syrup was given him; this he had scarcely tasted when he was suddenly seized with a convulsion, almost general. I attributed this accident to the entrance of a few drops of the liquid into the larynx. Recovered from this disastrous accident, he was put to the breast: he seized the nipple with avidity, quitted it, resealed it with uneasiness. Others were presented to him, which he seized, but always with the same agitation, and without success. I was too deeply interested in the conservation of this tender being not to occupy myself seriously with the discovery of the cause of such an effect. I examined the mouth, and at first sight discovered no anomaly in its structure; but as the accidents still persisted, I examined the buccal cavity a second time, and at length perceived at the entrance of the throat an extraordinary opening, which led me to the conclusion that my son was born without the velum pendulum palati.

“ However, two days had already elapsed, and, *erat periculum in mora*, I therefore decided to administer a small spoonful of goat's milk: of this he swallowed some few drops, but the greater portion returned by the nostrils. I repeated this method, but with little success. On the fourth day of all these perplexities I imagined the use of a long and thick brush, which I made of linen. This I soaked in milk, and presented to him; he seized

it, and was able to suck it. This little artifice having always succeeded it was employed for seven consecutive days. Emboldened by this success, I made a second brush, this time in the form of the nipple, and this artificial nipple enabled him to become accustomed by degrees to the natural one; and ten days afterwards he began to take the breast, but always with much difficulty and extreme slowness, and this caused him to waste away most pitifully.

“Within the space of five months he had ten wet nurses, and all avowed to me that this unfortunate infant, although applied to the breast for hours together, did not succeed in extracting half an ounce of milk in the whole day. Hence the almost total suppression of the urine and other excretions. Another nurse now presented herself, and animated by interest—that great and powerful motive—she engaged to take charge of this infant, in spite of the worry and embarrassments attending him. She had him under her charge during fourteen months; but, as she has since admitted, becoming wearied, and observing the daily wasting of this poor infant, she contrived in order to shorten her labour, without losing her salary, to feed him with a pap composed of equal parts of milk and water sweetened; and this method was secretly followed during thirteen of the fourteen months of her nursing. But this did not prevent her from applying him to the breast, in order to screen her conduct; but this application was always followed by convulsions and violent fits of coughing.

“However, he lived, and was weaned at the nineteenth month, when, to our great consolation, our infant got gradually stouter, his flesh became firmer, and his eyes expressed more animation, fluids were more rarely returned by the nose, and in the space of three weeks there was such a change in his health as I had not dared to expect.

“You easily understand my anxiety to discover the cause of such a happy change. I found it in the commencing development of the soft palate. This development daily increasing, things took their natural course, and my son was in a great measure delivered from the fiercest accidents which had so much alarmed me. From this epoch the deglutition of solids has always been accomplished with facility; but this has not been the case with fluids, especially in the case of water, the swallowing of which has always been laborious. The only liquids passing with less difficulty were red wine and muscat, their spirituous quality putting, without doubt, the organs of deglutition in action. We must further remark that the simple fact of inattention on the part of my son, either in eating or drinking, or the fact of the slightest obstacle touching the laryngeal orifice, produced, on the instant, a violent fit of coughing, which shook the whole of his muscular system. Lastly, we must mention that this tender infant, having without doubt learned the injurious results of the rapid descent of liquids, retained them in his mouth in order to swallow them insensibly, drop by drop, as it were, and this by a natural instinct more sure than the most

refined reasoning. In swallowing he had also the precaution of inclining the head forwards, as in the case of the Portuguese girl, related by M. de Jussieu.^a

“From all of these facts, scrupulously observed, it seems evident that the velum pendulum palati is absolutely necessary, especially to new-born infants, and that it serves, at all ages, principally in the deglutition of liquids; and, secondly, that it is further of marvellous use in sonorous articulation, and in giving to the voice its agreeable qualities, as I have previously observed, and as the following fact will demonstrate:—

“My son, whose sad situation I have just described, remained as if dumb until the age of four years, or if he spoke, it was, in a manner, unintelligible. At this period he began to pronounce more distinctly, but his voice was always embarrassed, and wanting in flexibility. In order to overcome this inflexibility, I thought of causing him to tattle unceasingly, in order that the frequent vibration of the fibres of the glottis might render them supple and nimble, and thus remove the stiffness and harshness so painful to me in the voice of my son. This expedient perfectly succeeded: by means of this continual babbling, which I took care to animate, his organ became supple and pliable to the most varied inflexions: the air, which, by the constant movements of inspiration and expiration, quits the lungs or enters them by the opening of the glottis, caused an insensible vibration in the nasal fibres by the accelerated movement of an uninterrupted tattle.”

Eustache continues:—

“A modern philosopher considers the organ of voice as a stringed instrument. The air escaping from the lungs is driven against the tendinous fibres of the glottis, causing them to give out sounds, the result of their vibration. Upon the flexibility of these fibres or vocal cords, upon their agility, and upon the precision of their vibrations, the voice depends for all its agreeable qualities—as the clearness of sound under ordinary circumstances, the softness of warbling in song, the delicacy of a modulation, and the brilliancy of a pearled cadence. But, in order to produce all these agreeable effects, there must be no deformity of the buccal cavity. You are aware, gentlemen, that such as are deprived of the soft palate, as well as those in whom this membranous partition is divided, have a disagreeable nasal tone of voice. This was the case with my son; for, although by the means employed as above described, he succeeded in pronouncing very distinctly, his voice was far from agreeable—he spoke through the nose, from the fact of the air, upon its escape from the glottis, not being directed by this partition into the posterior nares; on the contrary, the greater portion passes by the mouth, and the sounds formed not being reflected into the nasal cavities, the voice has no agreeable qualities.

^a *Memoires de l'Académie des Sciences*, 1718.

“I pass over in silence many other phenomena observed upon my infant. M. Dodart, who has written an admirable paper upon the mechanism of the voice,^a treats this matter in a manner which embellishes and fortifies my observations; but, inasmuch as the vain display of learning would add nothing to the verity of the facts I have just exposed, I shall content myself with referring my readers to his paper.

“I have frequently presented my son to many members of the Academy of Science and Belles-lettres of this city, and the different experiments above related were performed in their presence. It is now about three months since this dear child died from an attack of small pox. He would at present have attained his fifth year.”

Subsequent Observations in support of the above.

“OBS. II.—M. Rey, *Avocat au Parlement*, called me in on the 12th of October, 1779, to see his daughter, aged twelve days. M. Foulquier, the surgeon generally attending the family, informed me that it had been impossible to suckle this child, and that its only nourishment had been goat's milk, administered in small spoonfuls. On examining the buccal cavity, we found that this child was deprived of the velum palati almost in the same manner as my son, but with this difference—that in the place of the pillars there was on each side a caruncula the size of a pea, and at the point corresponding to the articulation of the cuneiform apophysis of the occipital with the body of the sphenoid, there existed a fleshy excrescence the size of a bean. I determined upon following the same course as in the case of my infant. This little one commenced to suck from the breast on the sixth day, but with great difficulty; the greater portion of the milk returned by the nose. She was sent out to a wet nurse in the country, but afterwards brought back to town by my advice, but all in vain. The same vice continuing to exist, the difficulty of suckling remained the same, the convulsions redoubled, extreme wasting resulted, and the little patient fell into a low fever. The impoverished state of the blood occasioned, in different parts of the body, tumours which suppurated, death at length closing the scene after five months of suffering.

“OBS. III.—On the 6th of June, 1781, Dr. Rouillet begged me to see the child of a M. Fabregues. The child was twenty days old, and all attempts to suckle it had been fruitless. On first sight it was perceived that the infant was the subject of hare-lip. The slightest drop of fluid—all of which, besides, returned in a great measure by the nose—excited violent convulsions. I attentively examined the interior of the mouth, and clearly perceived that the soft palate was wanting. The rest being perfect, I ordered the administration of pap, which was easily swallowed, but his stomach not being able to support this kind of food, he perished on the twenty-fifth day after birth.

^a Académie des Sciences, Année 1700.

“OBS. IV.—M. Cassan, merchant, of Pézénas, consulted me on the 14th of June, 1781, about his daughter, who, fifteen days old, had not been able to take the breast up to that time, the least liquid causing suffocation. The same means employed in my son’s case were resorted to—she being deprived in the same manner of the *velum pendulum palati*—but all in vain. When applied to the breast the accidents were renewed, the liquids did not pass: she fell into the last degree of *marasmus*, and expired three months after birth.

“OBS. V.—On the 12th of September, 1781, I was called to an infant of Jacques Visset, blacksmith, at Sauvain, a village a league distant from Beziers. M. Valouzière, master of surgery, met me there. This child, only eight days old, had not been able to take the breast, and had suffered similar accidents to those related in the preceding cases. On examining the mouth, we became convinced of the absence of the soft palate. I advised the child to be fed with pap, which was easily swallowed; suckling was from time to time attempted, but without success, every attempt renewing the anxiety and distress. She died on the fortieth day after birth, wasted and extenuated.

“OBS. VI.—The following case was communicated to me by M. Cabanon, *maître en chirurgie à Capestan*, three leagues from Beziers. He was called, during the month of September, 1782, by André Espéron, to see a child four days old, whom they had been unable to suckle, and to whom it had not been possible to administer liquid of any kind.

“It resulted, from the examination, that this little patient had no soft palate. So long as she lived she was fed with pap; without being very stout, she seemed in tolerable health. Almost the entire village were witness of the fact that, whenever it was attempted to administer any liquid, the child was in danger of suffocation, and that the fluid was almost entirely ejected by the nostrils. She died suddenly at about the age of nine months, without its being possible to determine the cause of death.

“From all these observations I conclude that, whenever an unfortunate infant is born without the *velum pendulum palati*, that it is essentially necessary to feed it from the first with pap; but, especially, we must abstain from applying it to the breast. The difficulty experienced in the act of suction, the accidents which result, the convulsions which follow, with the anxiety tormenting him, are so many causes of irritation, producing *marasmus*, &c., and conducting at length to the tomb. If I had in every case followed this method, perhaps not one of these tender victims whose cases I have related above would have perished. I leave this reflection to your judgment.”

The following remarks are those which M. Verneuil appended to the observations of Eustache:—

“Before producing the second part of this paper, where we shall find the operation of staphyloraphy indicated, and described in so remarkable a manner, I desire to dwell a short time upon the preceding facts, in order to show all their importance—abstraction being made of the question of operative surgery.

“The primitive malformation now occupying our attention was already known ere the end of last century, were it only by those surgeons who had observed *complicated* hare-lip. But we believe that, previous to Eustache, none had studied the simple lesion, as confined to the soft palate: it is certain that no one had, previous to this, so exactly described the consequences and prognostics. Our author, on the contrary, after having described and insisted upon the essential uses of the velum pendulum palati, enumerates very faithfully the accidents resulting from its vicious conformation, viz. :—the impossibility, and even dangers, of suckling; the imperfection of language from default in the pronunciation, &c. After which he indicates the proper means of preserving the precarious existence of the unhappy beings thus affected; and he demonstrates the efficacy of his councils by the example of his own son, who survived the first year of existence, only perhaps on account of the minute care taken to insure his alimentation.

“The series of facts produced by Eustache demonstrate the extreme gravity of congenital fissure of the soft palate—gravity partaken by this deformity with congenital fissure of all the structures, lip, hard and soft palate, and upon which modern authors themselves do not, perhaps, sufficiently insist. Upon a given number of infants born with an extensive fissure of the palatine arch, how many survive and how many succumb? This, exact statistical documents do not permit us to decide; but it is certain that a very large number perish at an early period. This is a fact pointed out by Dieffenbach and others, and which has been, on many occasions, confirmed in the discussions of the Société de Chirurgie. Further, it is evident that the prognostic, other things being equal, is more serious in cases of fissure of the velum palati than in cases of hare-lip, inasmuch as the latter may be remedied at a very early age, while the operation of staphyloraphy is almost unanimously postponed to the period of adolescence, and not without good reason.

“One will further remark in the case of the son of Eustache, the kind of vocal gymnastic instituted with success by the father; also, that secondary increase of the velum palati, being a kind of natural autoplasty by which the soft palate seemed, towards the twentieth month, to become much more developed posteriorly.”

In a nosographical point of view this first portion of the papers by Eustache presents most incontestible interest; it may also be consulted with advantage by such surgeons as would write a useful paragraph on

the precautions necessary to assure the existence of infants affected with congenital fissure of the velum pendulum palati.

This hiatus, to which M. Verneuil so justly draws attention, has long since struck us, for we have, as the profession is aware, paid particular attention to the *therapeutique* of primitive vices of conformation. In all the observations of individuals affected with cleft palate which have fallen under our notice, we have carefully remarked the special attentions employed during their lactation, and to which they were indebted for their existence.

These artifices vary according to the extent of the congenital injury. When the solution of continuity affects merely the velum palati, as in the case of the son of Eustache, maternal suckling is still possible; but, in order to its facility, the infant must be applied to and retained at the breast in the vertical position. It was in this way that M. Stephenson (the American medical man upon whom M. Roux performed his first operation of staphyloraphy) was nursed. M. Roux took care to point out this happy inspiration of the mother of M. Stephenson in his first paper upon this subject, and he repeats that he has since had many occasions to recommend the same precaution, and that he has seen it succeed in every case where the injury was the same in extent. This expedient is of more value than that of Eustache, inasmuch as many of the infants which he caused to be fed with solid aliments succumbed, as seen by his observations. If his son survived, this result was owing to his continued application to the breast, in spite of the administration of pap, and especially to the incessant attentions with which he was surrounded.

When the cleft velum is accompanied by hare-lip, single or double, which is frequently the case, maternal suckling is no longer to be thought of, the infant not being able to seize the nipple. In these cases, as in that of Lemaitre, a sucking-bottle must be resorted to. The nipple of this instrument must also be longer than under ordinary circumstances; and again, its orifice must be narrow in order to allow a feeble flow of its contents; the act of deglutition being very slowly accomplished, there is thus no penetration of liquid into the air passages.

But, to return to our principal subject, which we may do without quitting the interesting observations furnished by the Surgeon of Beziers. It has been observed, that immediately on the child being weaned, Eustache no longer speaks of the obstacles to the alimentation of his infant resulting from the bifidity of his palate; the fact is, that the education of the parts has been promptly accomplished. In spite of their infirmity these little patients are not long before eating and drinking with the same facility as healthy subjects of the same age. One sees that upon the child being weaned, the arrest of development ceases to compromise its existence.

At this period a new series of trials arise—those relating to the phonic apparatus, and these are of longer duration. Although the first series of the infant may be unmodified by the cleft palate, this is no longer the case with articulate sounds, so soon as the epoch arrives when the child begins to talk. The incomplete development of these parts renders speaking laborious, and infants affected with this vice of conformation must needs be incited; if they are abandoned to themselves they remain mute, or only utter sounds ill articulated. Without great patience and especial attentions, similar to the example furnished us by Eustache, we cannot arrive at the removal of this state of things, and the voice remains offensive and disagreeable.

This imperfection of speech exercises a serious influence upon the character of these infants, although they may make themselves understood by their parents, it is no longer the case when they address themselves to their little comrades, who refuse to allow them to join in their games. Again, at a later period, when the moment of commencing their education has arrived, the difficulty of making themselves understood disables them from profiting from the advantages of public instruction. Deprived of the stimulus of emulation and remaining at home, they study but little, work badly, and become unceasingly discouraged, and rarely arrive at the completion of their particular studies.

And still, by perseverance and a but slightly special study, commenced at an early age, this vice in their pronunciation might be so far corrected as to allow them to become acquainted with other than mere family life. It is not necessary that the amendment should be so very considerable, in order to suggest to them the idea of entering into society, it suffices that their conversation becomes comprehensible. Accustomed from their infancy to their mode of speech, they are only imperfectly conscious of their defective language, and so soon as their hearers manifest no difficulty or fatigue in conversing with them, they forget whatever there may be unusual in their manner of speech.

Reading aloud, declamation, and even singing, are the exercises most adapted to improve their pronunciation. Under the influence of this gymnastic, the voice attains a greater extent, becomes less veiled, less nasal, and articulation of sounds less defective. Here we observe something analogous to what has already taken place with regard to the deglutition of liquids. When one observes these extensive clefts of the palate, one is astonished to see the subjects of them drink as naturally and promptly as if the palate were in a state of perfect integrity.

Nature possesses an infinity of resources. Should the integrity of an organic apparatus become compromised, its functions are not, as a consequence, destroyed. At first, their exercise is more or less interfered with; but if, by a forced and constant gymnastic, the remaining parts are brought into action, we gradually see the inconveniences which had

arisen disappear, and the apparatus, however incomplete it may be, recovers, in a great measure, its functions. “*La fonction fait l'organe,*” says M. J. Guerin; we have a new proof of this dogma. Deglutition an act of organic life, incessantly reproducing itself, the education of the remains of the palate, is quickly accomplished, and even liquids are, in a short time, ingested without accident. It is different with regard to the concurrence of these parts in the act of phonation. This function is under the control of animal life, and exacts the concurrence of the will, and of a will the more energetic according as the alteration in structure renders its accomplishment more laborious. However, it is but a difficulty which may be overcome by the prolonged and oft-repeated exercise of the injured organs.

Should the results leave us still something to desire, especially concerning the nasal tone of voice, we have the resources of prothetic apparatus.

In the example we have given of the excellent results of the employment of an obturator with artificial velum, the patient was fifty-four years of age, and still his education, as we have remarked, was more rapid than that of individuals much younger. The desire of succeeding, comes in aid of the injured organs. But this is not the only example which we have at present before us: M. Prêtreterre has shown us many cases of young people now under his treatment. We intend to publish, at a future period, the complete notes of these cases.

It is especially the young who will reap the greatest benefits from prothesis, and more peculiarly those already enjoying a large share of physical qualities. Nothing spoils so much the charm of beauty, or tarnishes its brilliancy, as the imperfection of language such as results from cleft palate.

The greatest obstacle to the common use of the obturator, with movable velum, is the cost. Allow us to remark that the price of such an apparatus is not at all exorbitant; and, further, that these prothetic aids are indispensable only to the easy classes of society. M. Roux will again furnish us with proof:—“One conceives that, to a man destined to manual labour, necessitating but slight intellectual intercourse with his fellow-men, such and such a tone of voice is of little importance, and that even the most defective manner of speaking rigorously suffices him. Of what use would a more perfect language be to him? Consequently, a man in this condition rarely makes any great effort to alleviate the results of this deformity; and it is even difficult to instil into him a desire to be delivered of his infirmity. I can easily count, so few is their number, the peasants and individuals belonging to the lowest classes of our city populations upon whom I have practised staphyloraphy; and, again, the greater number submitted to the operation rather from the persuasion which chance threw it in my power to exert on them, than from any prospect of great change in their manner of speaking. I have seen patients refuse,

at the last moment, to submit to the operation to which they had previously consented."

We have sufficiently enlarged upon the resources offered by prothesis. Let us now say a few words as to the succour held out by operative surgery. When the fissure affects simply the *velum pendulum palati*, the results of autoplasty are complete, and, in this case, superior to those of mechanical prothesis; but when the fissure extends to the hard palate—and it is these cases we have especially in view—it is no longer the same. The surgeon can only unite the two portions of the *velum pendulum palati*, so that there is still left the breach of the hard palate.^a At the age when staphyloraphy may be attempted with success, there is no longer any hope of seeing the bony portions of the palate unite by a natural approximation; the patients will, in spite of the success of the autoplastic operation, be obliged to resort to some artificial means of closing the remaining aperture.^b

Previous to the epoch when the artists devoting themselves to buccal restorations had succeeded in constructing an obturator with an artificial *velum* capable of supplying the place of the normal soft palate, operative surgery was in the right whilst seeking to establish the continuity of this membrane, inasmuch as the parts were thus placed in such a condition that prothesis could complete the work of restoration by the simple adaptation of a metallic plate. But, is it now the same? Evidently not. Since the individuals affected with complete cleft of the palate are compelled to wear an instrument, that this apparatus should be more or less complicated is a question of slight import. The palatine plate is the most embarrassing portion of the piece, from the many points of support which

^a Since our principal object is to demonstrate the resources offered by mechanical apparatus, we must recall to mind an article which we published long since, "On the Employment of Maxillary Compressors in Cases of Hare-lip, complicated by congenital fissure of the palatine arch, and of the projection of median tubercule.—(*Bulletin de Thérapeutique*, t. xliv., p. 254 et 447.)—To the facts which we produce in support of the good effects of these apparatus, we must add the following, which was borrowed by M. Roux from the practice of Montain (de Lyon). We quote the words of M. Roux:—"This operation (the staphyloraphy) was scarcely created, and the first results I had obtained by it scarcely known, when M. Montain and myself had simultaneously the same idea—that of provoking in very young subjects the approximation of the two portions of the palatine arch in cases where the cleft affects this as well as the soft palate. Each conceived the idea of a double compression, applied on each side to the superior maxillæ. In one case he treated, and obtained this approximation of the two separate portions of the palate, the patient was but a few days old. He afterwards obtained complete adhesion, but without employing either scalpel or suture: he contented himself with cauterizing, at intervals, the edges of the remaining fissure, and thus obtained occlusion."

^b It will be seen by reference to the able paper of Mr. M. H. Collis, in our 21st Vol., that Dr. Debout quite under estimates the value of autoplastic operations. In the Report on Surgery in our present number, p. 436, some further suggestions on the subject will be found.—[Ed.]

it has upon the teeth; whereas the pharynx and base of the tongue quickly become accustomed to the contact of the artificial velum; and, moreover, the trial of such an apparatus is inoffensive; and as it may be applied at a time of life when staphyloraphy is still impossible, nothing hinders its being tried. Should it be found wanting in efficiency, no time has been lost, and the patient can always claim the succour of autoplasty, and he will take his determination with a knowledge of the cause. Should the operation of staphyloraphy not succeed, he can again return to the use of his obturator with movable velum; all that would be necessary is the slight enlargement of the plate of caoutchouc, the fissure having been made larger, and a slight increase in the force of the spring supporting this plate, inasmuch as the muscular tissues pressing upon the artificial velum would have been weakened.

Besides, we can strengthen our opinion by that of an eminent surgeon. Since he has observed, as ourselves, the results furnished by the obturator with movable velum, M. Nelaton has completely renounced the practice of staphyloraphy in cases of cleft affecting the hard and soft palate, even in those cases where there exists no deformity of structure: as, for example, in cases where it has been necessary to sacrifice the palate in the extraction of a fibrous polypus from the nasal fossæ.

In the actual state of science we do not hesitate to declare that in cases of complete cleft palate—that is to say, in cases where the fissure affects both bony and soft structures—the resources offered us by prothesis are greater than those of operative surgery.

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